

-- REMARKS --

The present amendment replies to an Office Action dated May 14, 2008. Claims 1-7 and 9-21 are pending in the present application. In the Office Action, the Examiner rejected claims 1-7 and 9-21 on various grounds. The Applicants respond to each ground of rejection as subsequently recited herein and requests reconsideration of the present application.

35 U.S.C. §103 Rejections

Obviousness is a question of law, based on the factual inquiries of 1) determining the scope and content of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; and 3) resolving the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03. The Applicants respectfully assert that the cited references fail to teach or suggest all the claim limitations.

A. Claims 1, 3-5, 7, 10, 11, 17, and 21 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,194,821 to Nakamura (the *Nakamura* patent) in view of U.S. Patent No. 5,144,146 to Wekhof (the *Wekhof* patent).

The Applicants respectfully assert that the *Nakamura* patent and the *Wekhof* patent, alone or in combination, fail to disclose, teach, or suggest an apparatus for reducing contaminants in a fluid stream whereby the light source is a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration between 1,000 and 0.100 microseconds alternating with an idle period between 10,000 and 1 microseconds, as recited in independent claim 1, or an apparatus for reducing contaminants in a gas stream including a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration less than or equal to 1 microsecond alternating with an idle period of about 100 microseconds, as recited in independent claim 17. As noted by the Examiner on page 2 of the present Office Action, the excimer lamp of

Nakamura is not pulse operated. Thus, the *Nakamura* patent fails to disclose a dielectric barrier excimer discharge lamp driven with a pulse, as recited in independent claims 1 and 17.

Regarding independent claims 1 and 17, the *Wekhof* patent at most discloses a method for destruction of toxic substances with ultraviolet radiation in which the switching circuit arrangement and lamp provides a peak current that can be reached with a rise time of about 7 microseconds. See Figure 2; column 4, line 51 through column 5, line 12. The Applicants respectfully disagree with the Examiner's assertion that the excitation pulse duration is twice the rise time, i.e., 14 microseconds. The *Wekhof* patent is silent as to the shape of the pulse and whether the pulse is maintained at the peak value, so it is not possible to deduce the duration of the pulse. In addition, the rise time of about 7 microseconds in the *Wekhof* patent is greater than the excitation pulse duration of less than or equal to 1 microsecond recited in independent claim 17, regardless of the shape of the pulse after the peak value in the *Wekhof* patent. Therefore, the *Wekhof* patent fails to disclose a value for the excitation pulse duration as recited in independent claims 1 and 17.

Regarding independent claim 17, the *Wekhof* patent at most discloses a method for destruction of toxic substances wherein a UV source is pulsed at a repetition rate in the range of 5 to 100 Hertz (Hz). See column 4, lines 9-10. This corresponds to a period of 10,000 to 200,000 microseconds ($1/f$), not the period of 1000-20,000 microseconds/pulse calculated by the Examiner. Independent claim 17 recites an excitation pulse duration less than or equal to 1 microsecond alternating with an idle period of about 100 microseconds, which sums to a maximum period of about 101 microseconds. This is an order of magnitude less than the period disclosed in the *Wekhof* patent. Therefore, the *Wekhof* patent fails to disclose an excitation pulse duration less than or equal to 1 microsecond alternating with an idle period of about 100 microseconds as recited in independent claim 17.

Claims 3-5, 7, 10, and 11, and claim 21 depend directly from independent claims 1 and 17, respectively, and so include all the elements and limitations of their respective independent claims. The Applicants therefore respectfully submit that the dependent claims are allowable

over the *Nakamura* patent and the *Wekhof* patent for at least the same reasons as set forth above for their respective independent claims.

Regarding dependent claim 11, the *Nakamura* patent and the *Wekhof* patent fail to disclose the excitation pulse duration being less than or equal to 1 microsecond and the idle period being about 100 microseconds as claimed. As discussed for independent claim 17 above, the period from adding the excitation pulse duration and idle period as claimed is an order of magnitude less than the period disclosed in the *Wekhof* patent.

Withdrawal of the rejection of claims 1, 3-5, 7, 10, 11, 17, and 21 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent in view of the *Wekhof* patent is respectfully requested.

B. Claim 2 was rejected under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of U.S. Patent No. 6,063,343 to Say, *et al.* (the *Say* patent).

The Applicants respectfully assert that the *Nakamura* patent, the *Wekhof* patent, and the *Say* patent, alone or in combination, fail to disclose, teach or suggest each and every element of the Applicants' invention as claimed, as required to maintain a rejection under 35 U.S.C. §103(a). As discussed in Section A above, the Applicants assert that the *Nakamura* patent and *Wekhof* patent fail to disclose, teach, or suggest an apparatus for reducing contaminants in a fluid stream whereby the light source is a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration between 1,000 and 0.100 microseconds alternating with an idle period between 10,000 and 1 microseconds, as recited in independent claim 1. The *Say* patent also fails to suggest these elements.

Claim 2 depends directly from independent claim 1 and so includes all the elements and limitations of independent claim 1. The Applicants therefore respectfully submit that dependent claim 2 is allowable over the *Nakamura* patent, the *Wekhof* patent, and the *Say* patent for at least the same reasons as set forth above for independent claim 1.

Withdrawal of the rejection of claim 2 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of the *Say* patent is respectfully requested.

C. Claim 6 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of U.S. Patent No. 6,398,970 to Justel, *et al.* (the *Justel* patent).

The Applicants respectfully assert that the *Nakamura* patent, the *Wekhof* patent, and the *Justel* patent, alone or in combination, fail to disclose, teach or suggest each and every element of the Applicants' invention as claimed, as required to maintain a rejection under 35 U.S.C. §103(a). As discussed in Section A above, the Applicants assert that the *Nakamura* patent and *Wekhof* patent fail to disclose, teach, or suggest an apparatus for reducing contaminants in a fluid stream whereby the light source is a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration between 1,000 and 0.100 microseconds alternating with an idle period between 10,000 and 1 microseconds, as recited in independent claim 1, or an apparatus for reducing contaminants in a gas stream including a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration less than or equal to 1 microsecond alternating with an idle period of about 100 microseconds, as recited in independent claim 17. The *Justel* patent also fails to suggest these elements.

Claim 6 and claim 18 depend directly from independent claim 1 and independent claim 17, respectively, and so include all the elements and limitations of their respective independent claims. The Applicants therefore respectfully submit that dependent claims 6 and 8 are allowable over the *Nakamura* patent, the *Wekhof* patent, and the *Justel* patent for at least the same reasons as set forth above for their respective independent claims.

Withdrawal of the rejection of claims 6 and 18 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of the *Justel* patent is respectfully requested.

D. Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of Japan Patent No. JP 1-182527 to Akagi, *et al.* (the *Akagi* patent).

The Applicants respectfully assert that the *Nakamura* patent, the *Wekhof* patent, and the *Akagi* patent, alone or in combination, fail to disclose, teach or suggest each and every element of the Applicants' invention as claimed, as required to maintain a rejection under 35 U.S.C. §103(a). As discussed in Section A above, the Applicants assert that the *Nakamura* patent and *Wekhof* patent fail to disclose, teach, or suggest an apparatus for reducing contaminants in a fluid stream whereby the light source is a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration between 1,000 and 0.100 microseconds alternating with an idle period between 10,000 and 1 microseconds, as recited in independent claim 1. The *Akagi* patent also fails to suggest these elements.

Claim 9 depends directly from independent claim 1 and so includes all the elements and limitations of independent claim 1. The Applicants therefore respectfully submit that dependent claim 9 is allowable over the *Nakamura* patent, the *Wekhof* patent, and the *Akagi* patent for at least the same reasons as set forth above for independent claim 1.

Withdrawal of the rejection of claim 9 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of the *Akagi* patent is respectfully requested.

E. Claims 19 and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of U.S. Patent No. 5,925,320 to Jones (the *Jones* patent).

The Applicants respectfully assert that the *Nakamura* patent, the *Wekhof* patent, and the *Jones* patent, alone or in combination, fail to disclose, teach or suggest each and every element of the Applicants' invention as claimed, as required to maintain a rejection under 35 U.S.C. §103(a). As discussed in Section A above, the Applicants assert that the *Nakamura* patent and

Wekhof patent fail to disclose, teach, or suggest an apparatus for reducing contaminants in a gas stream including a dielectric barrier excimer discharge lamp driven with a pulse having an excitation pulse duration less than or equal to 1 microsecond alternating with an idle period of about 100 microseconds, as recited in independent claim 17. The *Jones* patent also fails to suggest these elements.

Claims 19 and 20 depend directly from independent claim 17 and so include all the elements and limitations of independent claim 17. The Applicants therefore respectfully submit that dependent claim 19 and 20 are allowable over the *Nakamura* patent, the *Wekhof* patent, and the *Jones* patent for at least the same reasons as set forth above for independent claim 17.

Withdrawal of the rejection of claims 19 and 20 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Wekhof* patent, further in view of the *Jones* patent is respectfully requested.

F. Claims 12-15 have been rejected under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent in view of the *Jones* patent.

The Applicants respectfully assert that the *Nakamura* patent and the *Jones* patent, alone or in combination, fail to disclose, teach, or suggest an apparatus for reducing contaminants in a fluid stream wherein the sensor activates a number of the plurality of light sources dependent on the pollutant load present in the fluid stream, as recited in independent claim 12. As noted by the Examiner on page 5 of the present Office Action, the *Nakamura* patent fails to disclose a pollutant sensor. Thus, the *Nakamura* patent fails to disclose the sensor activating a number of the plurality of light sources dependent on the pollutant load present in the fluid stream, as recited in independent claim 12.

The *Jones* patent at most discloses an air purification system with a secondary activation switch 92 that may include circuitry for sensing the level of ambient air contamination and automatically activating when a predetermined level of contamination is sensed. *See* Figure 2; column 4, lines 43-52. The *Jones* patent discloses activating the single UVC source 80, which is

the only UVC source, when the contamination level exceeds a threshold. Thus, the *Jones* patent fails to disclose the sensor activating a number of the plurality of light sources dependent on the pollutant load present in the fluid stream, as recited in independent claim 12.

Claims 13-15 depend directly from independent claim 1 and so include all the elements and limitations of independent claim 12. The Applicants therefore respectfully submit that the dependent claims are allowable over the *Nakamura* patent and the *Jones* patent for at least the same reasons as set forth above for independent claim 12.

Regarding claim 14, the *Nakamura* patent and the *Jones* patent fail to disclose the sensor being further operable to control pollutant load in the fluid stream as claimed.

Regarding claim 15, the *Nakamura* patent and the *Jones* patent fail to disclose the sensor being further operable to control dielectric barrier excimer discharge lamp function as claimed.

Withdrawal of the rejection of claims 12-15 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent in view of the *Jones* patent is respectfully requested.

G. Claim 16 was rejected under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Jones* patent, further in view of the *Wekhof* patent.

The Applicants respectfully assert that the *Nakamura* patent, the *Jones* patent, and the *Wekhof* patent, alone or in combination, fail to disclose, teach or suggest each and every element of the Applicants' invention as claimed, as required to maintain a rejection under 35 U.S.C. §103(a). As discussed in Section F above, the Applicants assert that the *Nakamura* patent and the *Jones* patent fail to disclose, teach, or suggest an apparatus for reducing contaminants in a fluid stream wherein the sensor activates a number of the plurality of light sources dependent on the pollutant load present in the fluid stream, as recited in independent claim 12. The *Wekhof* patent also fails to suggest these elements.

Claim 16 depends directly from independent claim 12 and so includes all the elements and limitations of independent claim 12. The Applicants therefore respectfully submit that dependent claim 16 is allowable over the *Nakamura* patent, the *Jones* patent, and the *Wekhof* patent for at least the same reasons as set forth above for independent claim 12.

Withdrawal of the rejection of claim 16 under 35 U.S.C. §103(a) as being unpatentable over the *Nakamura* patent and *Jones* patent, further in view of the *Wekhof* patent is respectfully requested.

SUMMARY

Reconsideration of the rejection of claims 1-7 and 9-21 is requested. The Applicants respectfully submit that claims 1-7 and 9-21 fully satisfy the requirements of 35 U.S.C. §§102, 103, and 112. In view of the foregoing, favorable consideration and early passage to issue of the present application is respectfully requested.

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Respectfully submitted,
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